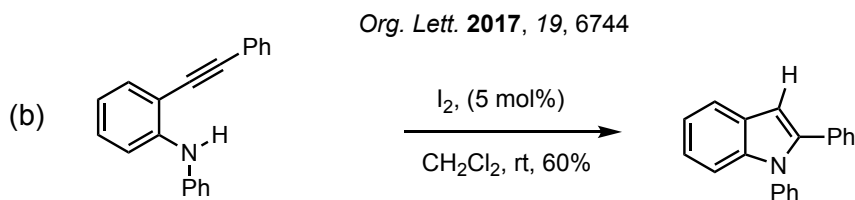


# Organic Cumulative Exam (February 1, 2018)

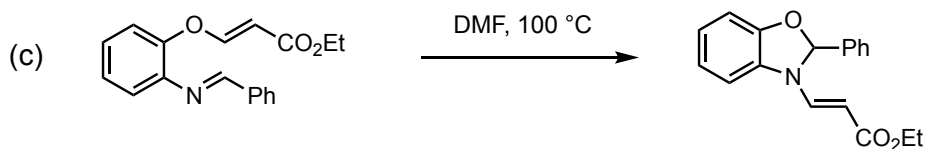
## Daesung Lee

1. (15 Points) The following ring closure reactions can occur either under thermal conditions or in the presence of a non-metal catalyst. Draw the mechanism of each reaction by drawing intermediates and arrows for electron movement.

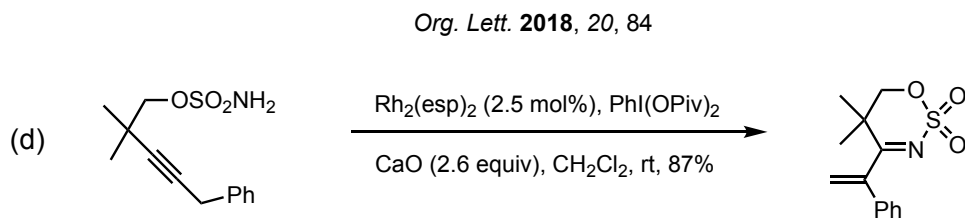
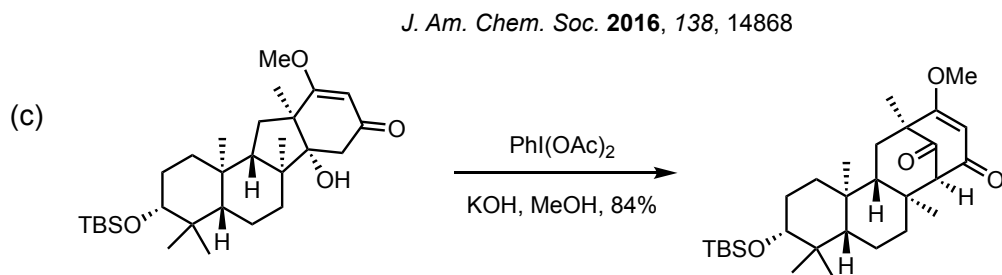
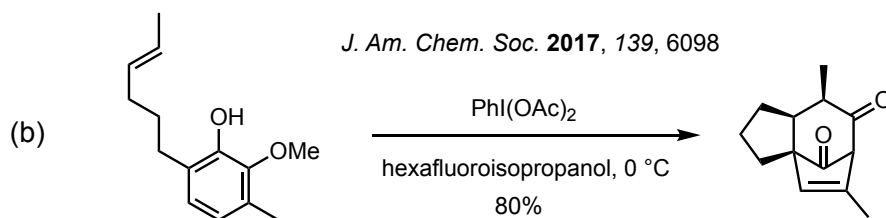
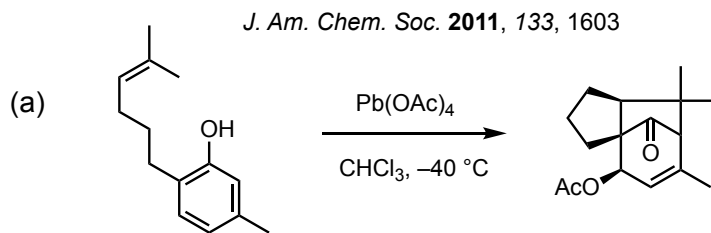
*Adv. Synth. Catal.* **2016**, 358,1566



*Org. Lett.* **2017**, 19, 5597

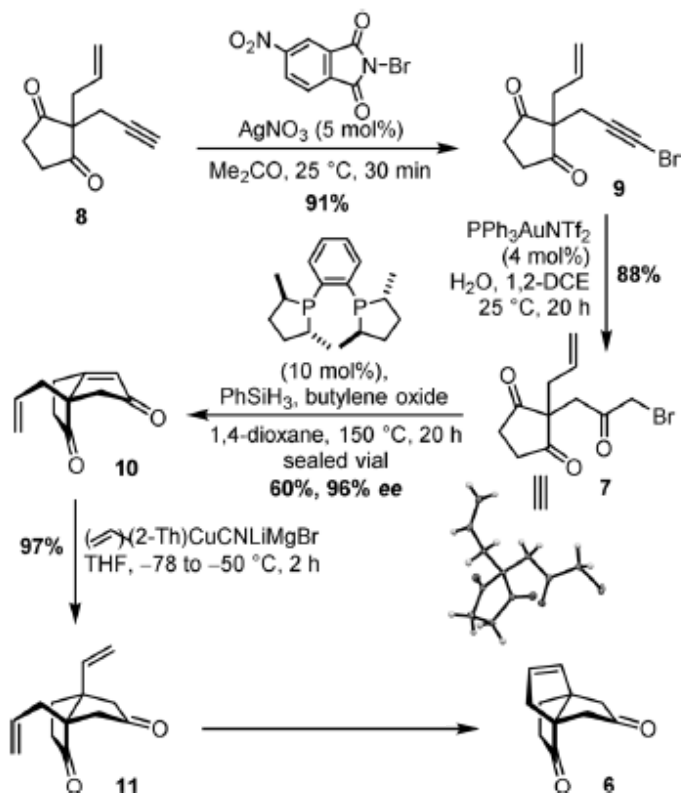


**2. (40 Points)** Consider the following oxidation-induced ring-forming reactions. Except the reaction in (a), the other transformations in (B)–(d) involve a [1,2] carbon–carbon bond-shift to deliver the indicated products. Provide the mechanism of each transformation by drawing the key intermediates and electron movement with arrows.



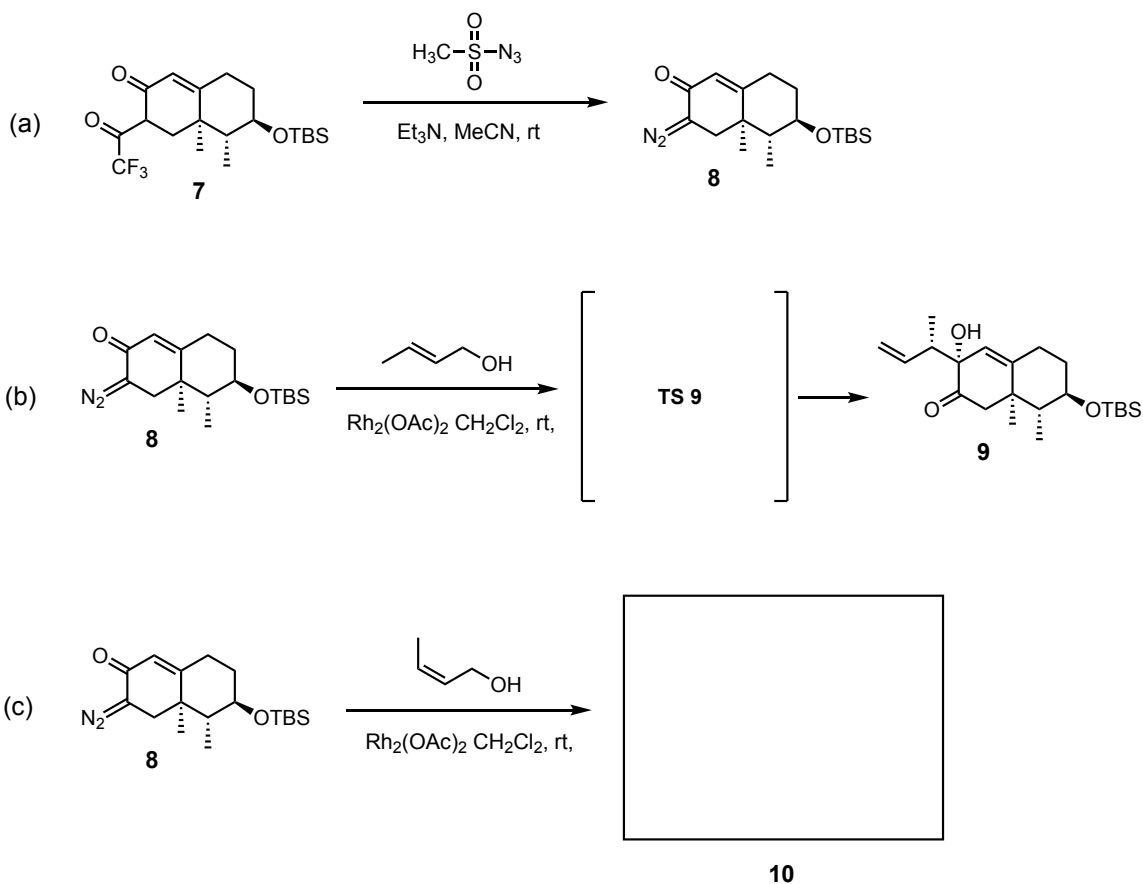
**3. (15 points)** The synthesis and structural revision of Dichrocephones A and B involves the following transformations.

*Angew. Chem. Int. Ed.* **2018**, *57*, DOI: 10.1002/anie.201711766



- (a) (5 Points) Draw a reasonable mechanism for the conversion of **8** to **9**.
- (b) (5 Points) Draw a reasonable mechanism for the conversion of **7** to **10**.
- (c) (5 Points) Provide any catalyst that can transform **11** to **6** in a single step.

4. (30 points) Consider the following transformations, which is a part of the total synthesis of Periconianone A (*J. Am. Chem. Soc.* **2017**, *139*, 16096).



(a) (10 Points) Draw a reasonable mechanism for the conversion of **7** to **8** in (a).

(b) (10 Points) Draw the structure of a transition state (TS **9**) that leads to the structure and stereochemistry of product **9** (in (b)).

(c) (10 points) By changing the geometry of the reacting crotyl alcohol, product **10** will be generated through a transition state closely related to TS **9**. Draw the structure of **10** unambiguously.